

WO 01/00937

PCT/AU00/00724

13

CLAIMS

1. A downpipe filter including an inlet to receive water from a roof gutter, a first branch from the downpipe for directing diverted water from the downpipe to a filter,

5 a return branch from the filter for returning filtered water to the downpipe, and another filter to filter water from the downpipe and situated between the first branch and the return branch.

10 2. A downpipe filter as claimed in claim 1 wherein the first branch includes a dirt trap to trap dirt which is filtered by the filters.

15 3. A downpipe filter as claimed in claim 2 wherein said dirt trap has a removable bung to enable cleaning of dirt from the dirt trap.

20 4. A downpipe filter as claimed in claim 3 further including a secondary filtration unit downstream of the return branch and including a second branch from the downpipe which delivers water to a fine filter, water having passed through the fine filter being returned via a second return branch to the downpipe.

25 5. A downpipe filter as claimed in claim 4 further including a further filter in the downpipe in between the second branch and the second return branch.

6. A downpipe filter as claimed in claim 4 wherein the fine filter is a fine sock filter.

30 7. A downpipe filter as claimed in claim 6, further including a removable bung above the fine sock filter.

8. A downpipe filter as claimed in claim 7, wherein each of said removable bungs are threadably engaged with the filtration unit.

9. A downpipe filter as claimed in claim 8 further including a safety plug upstream of the first branch which is designed to open and allow release of water from

TOP SECRET - SECURITY INFORMATION

WO 01/00937

PCT/AU00/00724

14

the downpipe if the filters become blocked to a degree sufficient to cause a backup of water in the downpipe.

Sub A/5

10. A downpipe filter as claimed in any one of claims 1-9 wherein each of said filters is a stainless steel gauze filter.

11. A diverter valve and filter unit, including:

a branch extending from a downpipe for passing water diverted from the downpipe and returning the water to the downpipe via a water tube and return branch,

10 a shut-off valve for closing the downpipe downstream of the return branch,

a filtration device associated with the water tube,

a water flow rate detection device calibrated to measure the flow rate of water through the downpipe and to close the shut-off valve upon detecting a predetermined flow rate of water through the downpipe, whereupon water backs up in the water tube

15 for bypassing via the filtration device to a storage tank, and wherein said shut-off

valve is opened by the flow rate detection means upon detecting a diminished flow rate of water to the downpipe to enable water from the return branch to be delivered to the downpipe at a downstream position.

20 12. A diverter valve and filter unit as claimed in claim 11, wherein the filtration device includes a secondary filter downstream of a primary filter.

13. A diverter valve and filter unit as claimed in claim 12, wherein the primary filter includes a dirt trap associated with the branch which extends from the downpipe,

25 there being further provided one or more filter screens between the branch and the water pipe.

14. A diverter valve and filter unit as claimed in claim 13, wherein each of the primary and secondary filters have associated therewith removable bungs to enable 30 cleaning of the filters.

100724-AU-122101

15. A diverter valve and filter unit as claimed in claim 11, wherein the water flow rate detection device includes a cylinder mounted within the downpipe downstream of the branch therefrom, the cylinder being movable up and down along the downpipe and being biased upwardly by biasing means, the cylinder having a hollow interior 5 to receive water from the downpipe and including a drain to slowly release water therefrom, the cylinder gaining weight as it fills with water so as to counteract the bias of the biasing means so as to move the shut-off valve.

16. A diverter valve and filter unit as claimed in claim 15, wherein the drain is a 10 hollow shaft extending downwardly from the cylinder and the shut-off valve is mounted to the shaft and said shut-off valve closes against a valve seat situated within the downpipe.

17. A diverter valve and filter unit as claimed in claim 15, wherein the rate of 15 water flow delivered to the cylinder is adjustable by means of a valve tap situated upstream thereof.

18. A diverter valve and filter unit as claimed in claim 17, wherein an extendible bellows extends from the valve tap to the upper end of the cylinder. 20

19. A diverter valve and filter unit as claimed in claim 18, wherein said biasing means is a coil spring through which the shaft extends.

20. A diverter valve and filter unit as claimed in claim 15, wherein said drain has a 25 valve tap which enables adjustment of the emptying rate of the cylinder.

21. A diverter valve and filter unit as claimed in claim 15, wherein the drain drains to a downstream position of the downpipe.

30 22. A diverter valve and filter unit as claimed in claim 15, wherein a plug is situated downstream of the valve tap.

TOP SECRET - AUSTRALIA

23. A diverter valve and filter unit as claimed in claim 20 further including a safety plug located upstream of said branch to enable a burst and exit of water if said filtration device becomes clogged with debris downstream thereof.

Sub A2

24. A diverter valve and filter unit for connection to the downpipe of a guttering system including a tank having a tank inlet and two tank outlets, a first tank outlet for passing water after passage through a filtration means, a second tank outlet for passing water without filtration, a first valve means for controlling opening and closing of said second tank outlet depending on the flow rate of water through said tank inlet, said first valve means including a reservoir having an outlet to the reservoir through which said reservoir empties, an inlet to the reservoir for filling said reservoir from said tank inlet, means biassing said first valve means open, said reservoir inlet including second valve means for regulating the filling of said reservoir depending on said flow rate through said tank inlet, said first valve means closing said unfiltered outlet when said flow rate is such that the weight of said reservoir overcomes the bias of said biassing means.

25. A diverter valve and filter unit as claimed in claim 24 wherein the tank inlet is connected to the downpipe of a guttering system of a building.

20

26. A diverter valve and filter unit as claimed in claim 24 wherein the first valve means closes when the inflow to the tank is such that the reservoir fills at a greater rate than it empties through said reservoir outlet whereby the weight of the reservoir overcomes the bias of the biassing means to shut the unfiltered tank outlet.

25

27. A diverter valve and filter unit as claimed in claim 26 wherein the biassing means is a spring supporting said reservoir above said unfiltered outlet, said reservoir outlet is a hollow tube aligned with said unfiltered outlet, and said hollow tube has a plate affixed thereto at a given distance above said unfiltered outlet such that when said plate moves said given distance said plate covers and closes said unfiltered outlet, said unit further including sealing means between said plate and said unfiltered outlet.

Sub A3

WO 01/00937

PCT/AU00/00724

17

28. A diverter valve and filter unit as claimed in claim 26 wherein the biasing means is a spring supporting said reservoir above said unfiltered outlet, said reservoir outlet is an aperture therein, said reservoir having attached thereto a tube aligned with said unfiltered outlet, said tube having a plate affixed thereto at a given distance above 5 said unfiltered outlet such that when said plate moves said given distance said plate covers and closes said unfiltered outlet, said unit further including sealing means between said plate and said unfiltered outlet.

29. A diverter valve and filter unit as claimed in claim 27 or 28 wherein the inlet 10 to the reservoir includes a tube having a flow control valve.

30. A diverter valve and filter unit as claimed in claim 29 wherein the tank inlet feeds water to a valley within said tank, said valley having an opening therewith communicating with said tube and terminating at a lip from which water falls into said 15 tank, said tube also having a branch tube connecting thereto below said flow control valve for bleeding water from a given level within said tank.

31. A diverter valve and filter unit as claimed in claim 30 wherein the tank has an opening or openings for allowing drainage and cleaning thereof including removal or 20 in situ cleaning of the filtration means.

32. A diverter valve and filter unit as claimed in claim 31 wherein the filtration means is a filter made of stainless steel gauze.

TOP SECRET//FOOT